

REMARKS/ARGUMENTS

Favorable reconsideration of this application is respectfully requested.

Claims 1, 4-6, 15-28, 31, 32, and 34-45 are pending in this application. Claims 2, 3, 7-14, 29, 30, and 33 are herein canceled without prejudice. Claims 5, 6, 16, 19-28 are withdrawn. New claims 36-45 are added for examination. Applicant submits the claims as currently written, including the currently submitted amendments to the claims and the addition of the new claims, are clear from the original disclosure, and thus does not add any new matter.

In the outstanding Office Action, Claims 1, 4, 15, 17, 18, 31, 32, 34, and 35 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Claims 1 and 4 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Claims 1, 4, 15, 17, 18, 31, 32, 34, and 35 were rejected under 35 U.S.C. 103(a) as unpatentable over Tsuda et al. (US Patent 7,321,353, hereinafter “Tsuda”), in view of Kurabayashi et al. (US Patent 6,105,045, hereinafter “Kurabayashi”) further in view of Yokota et al. (US Patent 6,633,274, hereinafter “Yokota”).

In light of the outstanding ground for rejection, Claim 1 has been amended to clarify the claimed invention, thereby to more clearly patentably define over the cited prior art. To that end, Claim 1 is amended to clarify “said image data generating a signal which is to be impressed to the respective pixels of the EL display apparatus” and to recite new features, such as

when results of said aggregating of said weighted image data are larger than a predetermined value, suppressing an amount of current that flows in the EL element by shortening a time period to pass the current during one frame period by controlling said switching element, displaying a non-display area on the display screen of the EL display apparatus, and shifting the non-display area on the display screen synchronizing with said one frame period.

And also, the preamble of Claim 1 has been amended to recite “A drive method of an EL display apparatus that comprises a display screen in which a plurality of pixels each of which includes an EL element are formed in a matrix and a switching element which turns on/off a current that flows in the EL element,” The feature of “a switching element which turns on/off a current that flows in the EL element,” is supported by, for example, the transistor 11d shown in Figs. 1, 42, 43 and the switch 1131 shown in Fig. 113.

The feature of “suppressing an amount of current that flows in the EL element by shortening a time period to pass the current during one frame period by controlling said switching element,” is supported, for example, by Figs. 3, 13, 14 etc. and the corresponding disclosure in the specification. That is, it is sufficiently described that the feature of suppressing an amount of current that flows in the EL element by shortening a time period to pass the current during one frame period by controlling to turn on/off the transistor 11d or the switch 1131.

Likewise Claim 4 has been amended to clarify the claimed invention, and to that end, amended Claim 4 recites, “said image data generating a signal which is to be impressed to the respective pixels of the EL display apparatus” and an new feature, “a switching element which turns on/off a current that flows in the EL element.” This new feature is supported by, for example, the transistor 11d shown in Figs. 1, 42, 43 and the switch 1131 shown in Fig. 113. In addition, the last paragraph of Claim 4 has been clarified to state, “the gate driver circuit drives the gate signal line according to the start pulse signal, generates a non-display area on the display screen by controlling said switching element and shift the non-display area in a scanning direction of the gate driver circuit.” This feature is supported by, for example, Figs. 3, 13, 14 etc. and the corresponding disclosure in the specification.

Turning now to the outstanding rejection of Claims 1 and 4 rejected under 35 USC §112, first paragraph, the feature “**weighting image data** with respect to a color of respective

of the plurality of pixels, said image data generating a signal which is to be impressed to the respective pixels of the EL display apparatus,” is supported by, for example, by the disclosure at page 322, lines 5-14 of the specification, which discloses,

... The light emission efficiency of the EL elements 15 varies among R, G, and B. The light emission efficiency of B is the lowest. The light emission efficiency of G is the next lowest. The light emission efficiency of R is good. Thus, the multipliers 842 weight data by the luminous efficiencies. The multiplier 842R for R multiplies the R image data (Rdata) by the light emission efficiency of R, multiplier 842G for G multiplies the G image data (Gdata) by the light emission efficiency of G, and multiplier 842B for B multiplies the B image data (Bdata) by the light emission efficiency of B. ...

The feature “aggregating said weighted image data” is supported, for example, by the language at page 322, lines 15-16 ,of the specification (“The results produced by the multipliers 841 and 842 are added by an adder 843 and stored in a summation circuit 844.”) and Fig. 84.

In response to the rejection of Claims 1 and 4 rejected under 35 USC §112, second paragraph, the words --generating a signal which is-- have been added between the words “said image data” and “to be impressed to the respective pixels of the EL display apparatus” as explained above. Accordingly, this ground for rejection is believed to have been overcome.

Turning now to the rejection under 35 USC§ 103, this ground for rejection of Claim 1 is believed to have been overcome by the clarifications added to Claim 1, which states in part:

... weighting image data with respect to a color of respective of the plurality of pixels, said image data generating a signal which is to be impressed to the respective pixels of the EL display apparatus,  
aggregating said weighted image data, and  
when results of said aggregating of said weighted image data are larger than a predetermined value,  
suppressing an amount of current that flows in the EL element by shortening a time period to pass the current during one frame period by

controlling said switching element, displaying a non-display area on the display screen of the EL display apparatus, and shifting the non-display area on the display screen synchronizing with said one frame period.

The amount of the current that flows in the EL element is determined according to the magnitude of the image data that is input into the EL display apparatus. Therefore, it is possible to obtain the amount of current that flows in the EL display of the EL display apparatus by aggregating the weighted image data.

As shown the above feature, by aggregating of image data weighted with color of the pixel, it is possible to calculate the total current consumption of the EL elements of the display screen. Therefore, when results of said aggregating of said weighted image data are larger than a predetermined value, it is possible to suppress the amount of current that flows in the EL element by shortening time period to pass the current during one frame period, that is, by widening the total width of non-display area(s).

It is respectfully submitted that these features can not be achieved by a liquid crystal display panel composed of non-self-luminous elements as disclosed by Tsuda and Yokota, because it is impossible to change the emitting state of the back-light and to control the back-light partially.

Furthermore, the feature of “weighting image data with respect to a color(for example, R, G and B) of respective of the plurality of pixels” does not have the necessity for a liquid crystal display panel composed of non-self-luminous elements which disclosed by Tsuda and Yokota,

Accordingly, by the above feature of suppressing an amount of current that flows in the EL element by shortening a time period to pass the current during one frame period by controlling said switching element, it is possible to suppress the maximum electric power consumption of the EL display apparatus (that is, making the EL display panel long-lived or

miniaturization of the power supply circuit can be achieved) and to achieve a high movie display performance and a high quality image display with regard to contrast performance.

On the contrary, Tsuda is mainly directed to the invention of a liquid crystal display panel and discloses an example of EL display apparatus and an image memory. However, Tsuda does not disclose “aggregating said weighted image data, and when results of said aggregating of said weighted image data are larger than a predetermined value, suppressing an amount of current that flows in the EL element by shortening a time period to pass the current during one frame period by controlling said switching element,” as recited in Claim 1.

Kurabayashi is directed to an image processing apparatus and discloses that data for use in specifying an image to be registered and data indicative of processing contents to be executed are listed in list structure and the contents are processed based on the results of aggregate area. Therefore, the technical field of Kurabayashi is quite different from that of Applicants’ invention, which involves the drive method of an EL display apparatus. Further, although at col. 6, lines 1-17 Kurabayashi discloses “an aggregate area display unit,” however, Kurabayashi does not disclose or suggest the above explained one feature of “weighting image data with respect to a color of respective of the plurality of pixels, said image data generating a signal which is to be impressed to the respective pixels of the EL display apparatus, aggregating said weighted image data.”

Therefore, it is respectfully submitted that Kurabayashi does not cure the deficiencies of Tsuda and pending amended Claim 1 patentably defines over these references whether considered alone or in combination.

Yokota is directed to a liquid crystal display panel (not EL display panel) wherein the non-display area is fixed without shifting operation. Therefore, Yokota does not disclose the feature of “displaying a non-display area on the display screen of the EL display apparatus, and shifting the non-display area on the display screen synchronizing with said one frame

period.” Furthermore, Yokota does not disclose or suggest the other above explained features. Therefore, it is respectfully submitted that Yokota does not cure the deficiencies of Tsuda and Kurabayashi and that pending amended Claim 1 patentably defines over these references whether considered alone or in combination. Since Claim 15 depends from Claim 1, Claim 15 is also believed to be patentable over the applied prior art for the same reasons discussed above for Claim 1.

Turning now to Claim 4, Claim 4 recites, inter alia,

- a switching element which turns on/off a current that flows in the EL element;
- a gate driver circuit that drives a gate signal line selecting a line of the pixels;
- an aggregation circuit configured to weight image data with respect to color of respective of the plurality of pixels, said image data generating a signal which is to be impressed to the respective pixels of the EL display apparatus, and to aggregate the weighted image data; and
- a control circuit that controls a timing or a period to generate a start pulse signal for the gate driver circuit based on the aggregated image data, wherein
  - the gate driver circuit drives the gate signal line according to the start pulse signal, generates a non-display area on the display screen by controlling said switching element and shifts the non-display area in a scanning direction of the gate driver circuit.

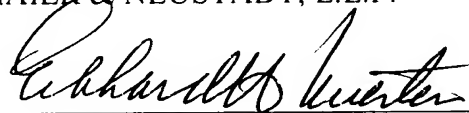
Accordingly, by virtue of the above feature(that is, “generates a non-display area on the display screen by controlling said switching element and shift the non-display area in a scanning direction of the gate driver circuit”) it is possible to suppress the maximum electric power consumption of the EL display apparatus, so as to prolong the effective operating live of the EL display panel and/or promote miniaturization of the power supply circuit, and to achieve a high movie display performance and a high quality image display with regard to the contrast performance. Accordingly, Applicants respectfully submit that the cited prior art references fail to disclose the structure or advantages of the invention defined by Claim 4, and that Claim 4 is therefore patentably distinguishing over Tsuda, Kurabayashi and Yokota.

Since Claims 17, 18, 31, 32, 34 and 35 depend from Claim 4, these dependent claims likewise are believed to be patentably distinguishing over the cited prior art.

Consequently, in view of the present amendment and in light of the above comments, no further issues are believed to be outstanding, and the present application is believed to be in condition for allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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